

CLAIMS

I claim:

1. A method for storing and searching data provided by a moving object,
comprising the steps of:

5 receiving at least one location of at least one moving object;

storing the at least one location from the at least one moving object in a database;

computing a projected travel course of the at least one moving object;

storing the projected travel course of the at least one moving object in the
database; and

10 performing a query on the projected travel course.

2. A computer readable medium having stored therein instructions for
causing a central processing unit to execute the method of claim 1.

15 3. The method of claim 1, further comprising the step of:

providing a notification to a user, wherein the notification is based on a result of
the query.

4. The method of claim 1, wherein the at least one location includes a
20 plurality of locations.

5. The method of claim 1, wherein the at least one moving object includes a
plurality of moving objects.

6. The method of claim 1, wherein the query returns an estimated time of arrival of the at least one moving object at a destination.

5 7. The method of claim 5, wherein the query returns which of the plurality of moving objects will be closest to a destination at a time.

8. The method of claim 5, wherein the query returns which of the plurality of moving objects may be closest to a destination at a time.

10

9. The method of claim 5, wherein the query returns which of the plurality of moving objects may be closest to a destination during a time interval.

10. The method of claim 5, wherein the query returns which of the plurality of moving objects will be closest to a destination during a time interval.

15

11. The method of claim 5, wherein the query returns which of the plurality of moving objects will always be closest to a destination during a time interval.

20 12. The method of claim 5, wherein the query returns which of the plurality of moving objects may always be closest to a destination during a time interval.

13. The method of claim 5, wherein the query returns which of the plurality of moving objects will be in a region at a given time.

14. The method of claim 5, wherein the query returns which of the plurality of moving objects may be in a region at a given time.

15. The method of claim 5, wherein the query returns which of the plurality of moving objects may be in a region in a time interval.

16. The method of claim 5, wherein the query returns which of the plurality of moving objects may always be in a region in a time interval.

17. The method of claim 5, wherein the query returns which of the plurality of moving objects will be in a region in a time interval.

18. The method of claim 5, wherein the query returns which of the plurality of moving object will always be in a region in a time interval.

19. The method of claim 5, wherein the query returns which of the plurality of moving objects will always be in a region during a time period.

20. The method of claim 5, wherein the query returns which of the plurality of moving objects may be in a region during a time period.

21. The method of claim 5, wherein the query returns which of the plurality of moving objects will be within a distance of each other sometime during a given time interval.

5

22. The method of claim 1, wherein the query returns an anticipated location of the at least one moving object at a certain time.

23. The method as in any one of claims 6-22, further comprising the step of:
10 providing a notification to a user, wherein the notification is based on the result returned by the query.

24. A method of querying trajectory data stored in a database, comprising the steps of:

15 displaying a map to a user;
selecting a geographic region on the map; and
performing a query on the trajectory data stored in the database.

25. A computer readable medium having stored therein instructions for
20 causing a central processing unit to execute the method of claim 24.

26. The method of claim 24, further comprising the step of:
returning a result to the user.

27. The method of claim 24, further comprising the step of:
providing a notification to the user, wherein the notification is based on the result
of the query.

5

28. The method of claim 24 wherein the step of selecting a geographic region
is performed by the user drawing a closed figure on a display map with an input device.

29. The method of claim 28, wherein the closed figure is a convex polygon.

10

30. The method of claim 29, wherein the closed figure is a circle.

31. The method of claim 29, wherein the closed figure is a concave polygon.

15

32. The method of claim 24, wherein the query determines if a moving object
will be in the geographic region at a given time.

33. The method of claim 24, wherein the query determines which of a
plurality of moving objects may be in the geographic region in a time interval.

20

34. The method of claim 24, wherein the query determines which of a
plurality of moving objects will be in the geographic region in a time interval.

35. The method of claim 24, wherein the query determines which of a plurality of moving objects will always be in the geographic region during a time period.

36. The method of claim 24, wherein the query determines which of a plurality of moving objects may be in the geographic region during a time period.

37. A method of performing spatio-temporal queries in a moving object database, comprising the steps of:

receiving a location of a moving object;

obtaining a path of the moving object;

obtaining a trajectory of the moving object;

storing the trajectory in the moving object database;

performing a query on the trajectory.

38. A computer readable medium having stored therein instructions for causing a central processing unit to execute the method of claim 37.

39. The method of claim 37, wherein the step of performing a query uses Structured Query Language.

40. The method of claim 37, wherein the step of performing a query further comprises the steps of:

specifying a time interval;

specifying a query region; and
determining if the moving object may be in the query region during the time
interval.

5 41. The method of claim 40, wherein the step of determining if the moving
object may be in the query region, further comprises the steps of:

 computing at least one possible route of the moving object, wherein the possible
route is computed using the trajectory and an uncertainty threshold; and

10 determining whether the moving object will be in the query region during the time
interval if the moving object follows the possible route.

 42. The method of claim 37, wherein the query determines where the moving
object will be at a specified time.

15 43. The method of claim 42, wherein the step of performing a query uses a
binary search algorithm to examine line segments in the trajectory.

 44. The method of claim 37, wherein the query determines when the moving
object will be at a specified location.

20 45. The method of claim 44, wherein the step of performing a query uses a
linear search algorithm to examine each line segment in the trajectory.

46. A method of providing a notification to a user in a database system,
comprising the steps of:

computing a trajectory of a moving device;

storing the trajectory in a database system;

5 specifying a condition;

determining if the condition has occurred; and

providing a notification to the user when the condition occurs.

47. A computer readable medium having stored therein instructions for
10 causing a central processing unit to execute the method of claim 46.

48. The method of claim 46, wherein the step of determining if the condition
has occurred uses continuous queries.

15 49. The method of claim 46 where the step of providing a notification to a
user is performed by sending a message to a wireless device.